

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C. 20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 04 July 2000 (04.07.00)	
International application No. PCT/US99/23860	Applicant's or agent's file reference LAMILL 1 PO
International filing date (day/month/year) 15 October 1999 (15.10.99)	Priority date (day/month/year) 16 October 1998 (16.10.98)
Applicant MILLSTEIN, Larry, S.	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

28 April 2000 (28.04.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Juan Cruz
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/23860

A. CLASSIFICATION OF SUBJECT MATTER

IPC(S) : GOIN 33/53, 33/556; C12Q 1/00, 1/68; C07K 1/04; C07B 61/00
US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/4, 6, 7.1, Digest 34, digest 35, digest 36, digest 37, digest 38; 436/ 501

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

USPAT on WEST, Derwent
search terms: combinatorial, channels, arrays, libraries

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,677,195 A (WINKLER et al) 14 October 1997, see the entire document especially the abstract and the figures, note figure 7 in particular.	1-11 and 16-21
Y	US 5,384,261 A (WINKER et al) 24 January 1995, see the entire document, especially the abstract and the figures.	1-11 and 16-21
Y	W0 96 03212 A1 (S. BRENNER) 08 February 1996, see the entire document especially the figures.	1-3, 16-21
Y	US 4,948,442 A (R. MANNS) 14 August 1990, see the entire document especially the figures and the abstract.	1-11 and 16-21



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
B earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 26 JANUARY 2000	Date of mailing of the international report 16 FEB 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JOSEPH W. RICIGLIANO Telephone No. (703) 308-0196

International application No.
PCT/US99/23860

International application No.
PCT/US99/23860

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 5,929,208 A (HELLER et al) 27 July 1999, see the entire document, especially the figures and the abstract.	1, 3, 11, 16 and 17-21
X	US 5,143, 854 A (PIRRUNG et al) 01 September 1992, see the entire document, especially the figures and the summary of the invention in columns 3 and 4.	18-21
P,A	WO 99/32219 A1 (ANTONECK et al) 01 July 1999, only the abstract was available and is provided. Note that the fluid guides read on channels and the middle plates masks.	1-3, 7 and 16-21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/23860

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 12-15
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/23860

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

435/4, 6, 7.1, Digest 34, digest 35, digest 36, digest 37, digest 38; 436/ 501

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 04 JAN 2001

WIPO

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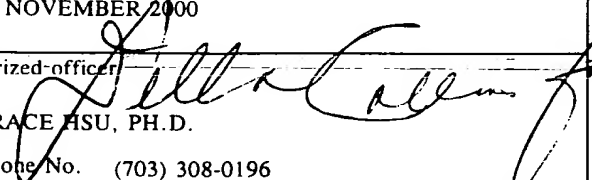
Applicant's or agent's file reference LAMILL 1 PO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/23860	International filing date (day/month/year) 15 OCTOBER 1999	Priority date (day/month/year) 16 OCTOBER 1998
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant MILLSTEIN, LARRY S.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 28 APRIL 2000	Date of completion of this report 20 NOVEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  GRACE HSU, PH.D.
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0196

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/23860

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed
- ☒ the description:
pages 1-54, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the claims:
pages 55-57, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the drawings:
pages 1-9, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

III. N n-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire international application.

☒ claims Nos. 12-15

because:

☐ the said international application, or the said claim Nos. _ relate to the following subject matter which does not require international preliminary examination (*specify*).

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 12-15 are so unclear that no meaningful opinion could be formed (*specify*).

Claims 12-15 are improper multiple dependent claims.

☐ the claims, or said claims Nos. _ are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/23860

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims <u>10-11</u>	YES
	Claims <u>1-9, 16-21</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-11 and 16-21</u>	NO
Industrial Applicability (IA)	Claims <u>1-11 and 16-21</u>	YES
	Claims <u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1-9 and 16-21 lack novelty under PCT Article 33(2) as being anticipated by US 5,677,195 (WINKLER et al).

US 5,677,195 teaches a method for the preparation of arrays of molecules using a series of blocks with channels cut in them to introduce reagents to specific portions (see the abstract, figure 7 and column 13 lines 45-60). The reference teaches that photoactivation of selected regions may be used in conjunction with the channel systems (see the abstract and column 8, lines 57-62). The reference specifically teaches that molecules on the substrate are capable of interacting with other molecules and hence constitute "analyte binding molecules" (col. 8, lines 8-21). Therefore, the invention anticipates the invention of claim 1. As the channels may be formed by combining a first and second surfaces the reference anticipates the invention of claim 2. The reference discloses both glass and plastic substrates and hence anticipates claim 3 (see col. 9, lines 45-55). The reference teaches that the substrate can be photoactivatable and that it can comprise a bifunctional linker/spacer which reads on a crosslinking agent (see col. 23, lines 15-36 for example); and hence anticipates claims 5, 6 and 9. The reference teaches the use of different masks for each step so that reagents are delivered to different sites (see col. 16, lines 54-56) hence the reference anticipates the invention of claim 7. In view of the foregoing the reference also anticipates claims 8 and 18-20. As the reference discloses devices prepared having an array of analyte binding member immobilized thereon and its use in screening for analyte binding molecules the reference anticipates the invention of claims 16 and 17. As the unactivated regions of the arrays set forth in the instant claims still bear protecting groups and cannot bind array members, the reference also anticipates claim 21.

Claims 10 and 11 lack an inventive step under PCT Article 33(3) as being obvious over US 5,677,195 in view of the Pierce Catalogue(1989).

See the teachings of US 5,677,195 supra. In addition the reference teaches that the substrate to be modified can be made (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

CLASSIFICATION:

The International Patent Classification (IPC) and/or the National classification are as listed below:

IPC(7): GO1N 33/53, 33/556; C12Q 1/00, 1/68; C07K 1/04C; C07B 61/00L and US Cl.: 435/4, 6, 7.1, Digest 34, digest 35, digest 36, digest 37, digest 38; 436/ 501

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

out of polystyrene (co. 14, line 49) and the use of amino linker groups (col. 15, lines 9-21). The reference fails to teach the use of NHS-ASA as a photolabile amine crosslinking agent for connecting an amine of one molecule to another molecule.

The Pierce catalogue teaches that NHS-ASA is a art recognized double agent (crosslinking agent) for attaching an amine to another molecules using photochemically activated conditions.

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use a double agent such as NHS-ASA as taught by the Pierce catalogue to attach a molecule to the amine modified surface as taught by US 5,677,195 because the Pierce catalog teaches that NHS-ASA is one of numerous art recognized crosslinking agents for attaching a amine of one molecule non-specifically to a second molecule. One of ordinary skill in the art would have been motivated to do so in order to create an array of molecules attached to amine surface without having to provide for any specific modification sites on the molecules to be bound to the amines as the ASA portion of the molecule results in nonselective linkages. One of ordinary skill in the art would have reasonably expected to be successful because NHS-ASA is an art recognized reagent which has been used for the attachment of amine bearing molecules non-specifically to second molecules.

Claims 1-11 and 16-21 meet the criteria set out in PCT Article 33-(4), as being industrially applicable.

----- NEW CITATIONS -----

The Pierce Handbook and General Catalogue. Pierce Inc, Rockford, IL (1989) pages 284 and 306.